

SIXTH—AND LAST—IN THIS EDUCATIONAL EXPERIMENT
ON MAGNETIC RECORDING TECHNOLOGY ... by

FERRROXOCUBE

CORPORATION OF AMERICA

SAUGERTIES, NEW YORK

**RECORDING HEADS ...
MAKE OR BUY???**



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Number Six—not the end of the line, but the beginning, we hope, of a new direction for your company... a direction to which each of these monographs has been urging you.

We have the data. We have the proof. We have the samples. We have the time. We'll travel. We are tired of writing. Call us in... the card will do it.

Here's the final sermon. Our topic today is...

RECORDING HEADS...MAKE OR BUY???



We believe that this should be the easiest decision you have ever made. . . if the arguments we have advanced so far in this series apply to your recording head designs, to your recording head needs, and to your recording head experience. Unless a very special situation exists in your company — and we haven't encountered one yet that alters our point of view — we believe that you ought to buy your recording heads from Ferroxcube.

We believe that we can satisfy any reasonable man as to the quality and precision we maintain. Our productive capacity is more than sufficient to ensure excellent delivery. The heads we produce are so superior to conventional heads that they usually pay for themselves in indirect (but very real) savings. Frankly, we don't think that any in-plant facility can compete with us, spec for spec.

The credit must go to the 4R5 ferrite and the all-glass-bonded process; without it, we probably *couldn't* compete with your in-house facility at all. *With it*, however, as you will see. . .

WE CAN BUILD A BETTER HEAD. . .

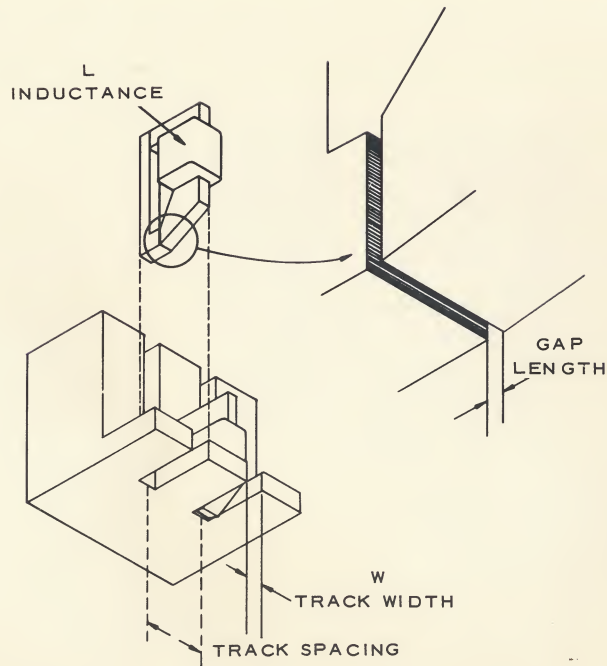
WITH BETTER CHARACTERISTICS. . . AND BETTER CONTROL OF THOSE CHARACTERISTICS. For example, final contour of the head may be specified to a tolerance of ± 0.0005 "; and its flatness to 2 lightbands; and its surface finish may be specified to better than 2 microinches. While this precision is not required in many applications, the fact that it is obtainable in our standard heads adds a comfortable margin of reliability and uniformity to the performance of these heads in less demanding applications.

FURTHERMORE, FERROXCUBE HEADS CAN SAVE YOU MORE THAN THEY COST. Here, for example, is the "before and after" comparison given us by one of our present customers. . .

**SYSTEM COST COMPARISON
FOR A 50-MILLION-BIT DISC MEMORY**

PARAMETER	ORIGINAL DESIGN	IMPROVED DESIGN
	(Conventional Flying Head)	(Ferroxcube Flying Head)
Flying Distance	250 μ inches	100 μ inches
Track Width	0.025 inches	0.015 inches
Bit Density (approx.)	400 bits/inch	1,000 bits/inch
Number of Heads required (for same access time)	156	64
System Cost (OEM)	\$246,000	\$208,000
Total Head Cost (OEM)	\$21,800	\$18,400

FINALLY, FERROXCUBE FACILITIES GUARANTEE YOU DEPENDABLE DELIVERY. We are now able to produce fully 40% of the *total* industry requirement for precision magnetic recording heads. Approximately 40% of this capacity is now committed to current production. The rest is available to you—on remarkably short lead-time.



HERE ARE THE FUNDAMENTAL

Fundamental Dimensional Relationships.

The drawing to the left indicates the fundamental dimensions that determine the performance—and, hence, the design — of a “flying head”. Note that the relationships between these critical dimensions and the head performance are given by

$$\text{Read-out voltage} = k_1 n W$$

where n = number of turns per winding

and W = track width

$$\text{Inductance } L = k_2 n W v$$

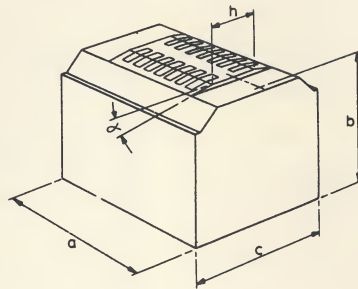
where v = velocity

$$\text{Drive } i \approx \frac{K_3 H}{n}$$

TECHNICAL RELATIONSHIPS INVOLVED...

Read-To-Write Relationships.

As illustrated here, certain dimensions and tolerances must be applied to multiple-head assemblies in which the read/write function is provided — whether in a unit assembly, or in a pair of assemblies. Note that this set of specifications is actually derived from the basic data format planned for the system.



Head-To-Head Dimensional Relationships.

Equally as important as the fundamental head-to-medium relationships are the dimensions and tolerances that relate one head to another in a multi-head assembly. These include: head *spacing* (distance between gap centerlines); head *separation* (distance between facing magnetic surfaces of adjacent cores); track width; gap length; and, of course, at least an estimate of gap alignment requirements.

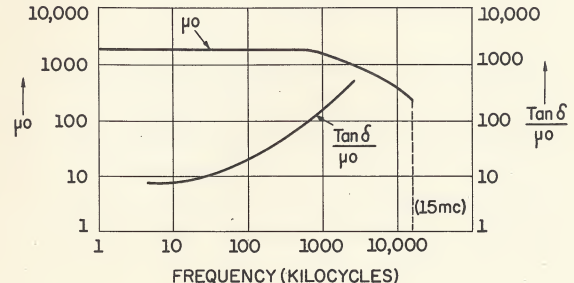
HERE'S HOW FERROXCUBE ALL-GLASS-BONDED RECORDING HEADS ARE DESIGNED AND MANUFACTURED...

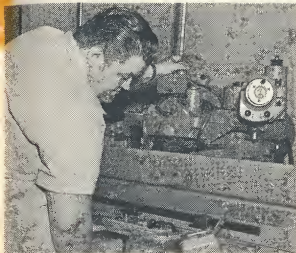
THE DESIGN may begin in either of two ways:

- You may prepare a complete electrical, magnetic, and mechanical specification, and then have us provide an equivalent all-glass-bonded design.
- You may merely state the head-to-medium spatial relationships, specify the limiting electromagnetic properties of the medium, and describe the input-output signals and interfaces. . . and let us write an equivalent specification.

FERROXCUBE 4R5 is the core material used in all-glass-bonded recording heads. It is unique in having chemical, thermal, and mechanical characteristics that are fully compatible with the special glass used to bond the head assembly; this unique formulation sacrifices very little in either its electrical or magnetic properties to achieve that compatibility, as the graph shows. These parameters are very accurately controlled.

**ALL-GLASS-BONDED
HEADS ARE MADE BY
A HIGHLY-DEVELOPED
FIVE-STEP PROCESS**



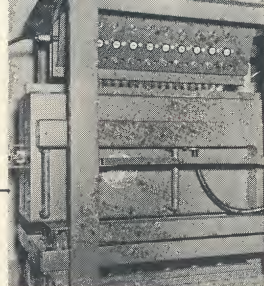


Precision Core Grinding . . . Ferroxcube ferrite facilities are unequalled anywhere in the world.

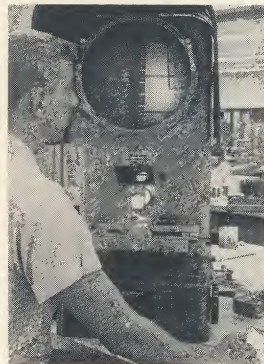
Precision Winding . . . Ferroxcube's modern winding facility employs the most modern fine-wire winding features and techniques currently available.



Quality-Assured Precision Assembly . . . Ferroxcube's new assembly line operates under the most rigid quality controls in the industry—from the ultimate security of 100% in-plant manufacture of all critical elements to the maintenance of "white-room" environments for all critical assembly operations.



Unique Glass Bonding Facility . . . Ferroxcube's all glass-bonding technique is an exclusive process.




Micro-Finish and Testing . . . Ferroxcube has developed completely new micro-finishing techniques compatible with the new higher dimensional - control standards made possible by all-glass bonding, and testing techniques, compatible with the 1.7 microinch RMS surface finish achieved on all standard heads.

IN SUMMARY, THEN, WE MAY SAY

that the specific advantages of Ferroxcube All-Glass-Bonded Recording Heads that argue in favor of buying them from us, rather than making any other kind yourself, are:

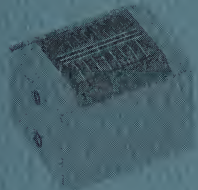
- Regardless of initial cost, they are always the *lowest-true-cost* means of satisfying your recording-system needs.
- They offer unique design flexibility, removing the stress of recording-head limitations from your system designs, and thus permitting you to make striking *direct and indirect economies* elsewhere in the system, or in its operating costs.
- They create new standards of *functional reliability* for your product, greatly increasing its *competitive appeal*.
- AND ONLY FERROXCUBE HAS ALL-GLASS BONDING!



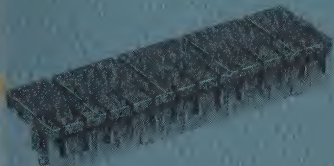
**THESE
EXAMPLES
WILL SERVE
TO ILLUSTRATE
THE RANGE
& VARIETY
OF HEADS
WE NOW
MANUFACTURE...**



◀ 7-Channel Read-Write
Contact Analog Tape
Head.

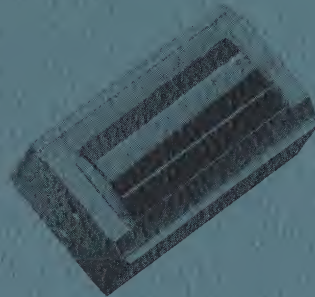
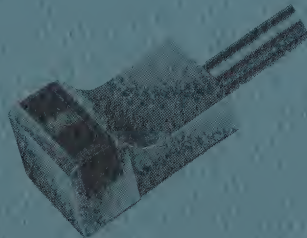


Digital Contact Head for a
"Magnetic-Stripe-Reader"
Used in Business-Machine
Applications. ▶



8-Track Analog Head for
a Tape Transport. ▶

◀ 13-Unit Assembly of Flying
Disc File Head.



**HOW
ABOUT
YOUR
MAGNETIC
RECORDING
SYSTEMS?
ISN'T IT
TIME WE
PUT OUR
HEADS
TOGETHER...?**

Gentlemen:

I read you, loud and clear, and here's my reaction:

- ☐ I believe you have reached my boiling point—have one of your application engineering group call me for an appointment, before I build up excessive pressure.
- ☐ I'm thawing. Send over one of your fire-breathing field engineers. (Have him call for an appointment, first.)
- ☐ I'm far from convinced—hardly warm, in fact—but I can't afford to ignore all-glass-bonding any longer. Send me your brochure, and any other fuel you wish to throw on the fire.

☐ Here's my Name _____ and Title _____
my Company _____
and Division _____
Street Address _____
City, State, Zip _____

☐ You're talking to the wrong party. Try your pitch on:

Name _____ Title _____

☐ At the Above Address or ☐ At: _____

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APPLICATION ENGINEERING
DEPARTMENT**

FERROXCUBE

CORPORATION OF AMERICA
SAUGERTIES, NEW YORK



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Saugerties, N. Y.

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